



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/743,969

12/23/2003

Luc Bouwens

920522-95346

9403

23644 7590 06/04/2007  
BARNES & THORNBURG LLP  
P.O. BOX 2786  
CHICAGO, IL 60690-2786

EXAMINER

HOLTON, STEVEN E

ART UNIT

PAPER NUMBER

2629

MAIL DATE

DELIVERY MODE

06/04/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/743,969	<b>Applicant(s)</b> BOUWENS ET AL.	
	<b>Examiner</b> Steven E. Holton	<b>Art Unit</b> 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is made in response to applicant's amendment filed on 4/26/2007. Claims 1 and 3-21 are currently pending in the application. An action follows below:

#### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1 and 3-21 have been considered but are moot in view of the new ground(s) of rejection based on newly found prior art.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1, 3, 4, 7-18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Booth, Jr. et al. (USPgPub: 2003/0043088), hereinafter Booth in view of Oguchi et al. (USPN: 6340976), hereinafter Oguchi.

Regarding claims 1 and 21, Booth discloses a calibration method for a display device and associated device. The method comprises "determining, for each real primary color separately, a virtual target primary color (paragraphs 25, 26, and 33)". Booth further describes, "determining a color gamut defined by the determined virtual

Art Unit: 2629

target primary colors (paragraphs 25, 26, and 33)", and "adjusting the drive currents to the sub-pixels to achieve a color inside the determined color gamut (paragraph 33)".

However, Booth does not expressly disclose determining the virtual target primary color based on a center of gravity formed by color coordinates of the corresponding real primary colors of the pixels of the display device.

Oguchi discloses selecting a color gamut for a plurality of displays using real primary color targets of multiple displays and then calculating a center of gravity of the real primary color targets to generate a virtual primary color target to be applied to each of the displays in the array of display devices (Fig. 5; col. 10, lines 20 – 67).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Booth and Oguchi to create a display device that selects a virtual color gamut using a calculation of a center of gravity of real primary color targets. Oguchi uses the center of gravity calculation on a set of primary color targets to generate a virtual color target to be applied to multiple displays in an array of displays. The real color targets are used to represent the color gamut of each display rather than individual subpixels of the displays. However, it would have been logically obvious to one skilled in the art that center of gravity calculations could be used on any set of color gamuts providing real primary color target values. The display system of Booth provides measurements of the real primary color target values of individual pixels and subpixels within a single display and generates virtual primary color targets based on the real measurements. At the time of invention it would have been obvious to one skilled in the art that the center of gravity calculations used to produce a target color

Art Unit: 2629

gamut for multiple light emitting regions could be applied to the measured color targets of the pixels of the display device of Booth. The new type of calculation method would be a different way of producing target values for the overall color gamut of a single display device of Booth rather than for multiple displays of Oguchi. Thus, it would have been obvious to apply the calibration methods of Oguchi to the display calibration methods of Booth to produce a device as described in claims 1 and 21.

Regarding claim 3, Booth discloses selecting virtual target primary colors for the color gamut and allows the color coordinates of the virtual target primary colors to vary by 10%-20% of the originally selected gamut defined by the target values (paragraph 27). If the target values were selected using the center of gravity calculations of Oguchi, then varying the targets by different percentages from the calculated targets would require selecting targets that vary from the center of gravity by up to 20%.

Regarding claim 4, Oguchi discloses calculating the center of gravity of a group of real primary color values in a group. The Examiner notes that the limitations of claim 4 merely describe calculating the center of gravity line, but do not use the center of gravity line to further calibrate or affect the calibration of the display. The claim merely recites calculating a center of gravity line based on the center of gravity. At the time of invention it would have been logically obvious to one skilled in the art that a center of gravity line could be calculated from a found center of gravity using basic and well-known mathematical techniques.

Regarding claim 5, Oguchi discloses using the calculated center of gravity as the virtual target value for calibration of the multiple display devices. The center of gravity

Art Unit: 2629

falls on the center of gravity line. Therefore, using the center of gravity as the virtual target primary would read on “choosing the color co-ordinates of the virtual target primary color on the center of gravity line or...” as recited in claim 5. It could be further argued that using the teachings of Booth to select different color targets to increase the overall range of the color gamut (paragraphs 26 and 33). If the virtual targets were selected as altered from the calculated center of gravity, the new virtual target points would fall on a center of gravity line that connects the center of gravity to the altered virtual target.

Regarding claims 7-9, Booth discloses selecting virtual target primary colors and a color gamut that can be achieved by all of the sub-pixels of the display (paragraph 26). All colors in a color gamut are produced from linear combinations of the primary colors, so Booth discloses selecting a color gamut wherein all colors of the gamut are achieved by a linear combination of the primary colors.

Regarding claim 10-15, Booth discloses selecting the color gamut, which includes the target primary colors, depending on the application of the display (paragraph 33). Booth further discusses embodiments with a color gamut achievable by 80-90% of the pixels that produces less color uniformity than a gamut that would be achievable by 100% of the pixels. The different embodiments would allow for selection of better color uniformity or a larger color saturation depending on the which embodiment was chosen.

Regarding claims 16 and 17, Booth discloses the recalculation of the color gamut at any time during the lifetime of the display to correct for aging of the display (paragraph 27).

Regarding claim 18, Booth discloses a system where the number of target primaries and real primaries are the same (paragraph 25).

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Booth in view of Oguchi and in further view of Kojima et al. (USPN: 6313806), hereinafter Kojima.

Regarding claim 6, as discussed above the combination of Booth and Oguchi discloses all of the limitations except, "wherein a target luminance for each target virtual primary is determined such that all or substantially all of the real primaries are able to realize the target luminance of the corresponding virtual primary."

Kojima discloses a color gamut configuration method that includes correcting the chromaticity of the display and then correcting the intensity of the display (col. 4, lines 16-26).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Booth, Oguchi, and Kojima to produce a color calibration system for a display device including luminance correction. The motivation would have been to combine the luminance correction of Kojima for the purpose of removing differences in brightness from the color corrected display. Thus, the combination of

Art Unit: 2629

Booth, Oguchi, and Kojima would have been obvious to one skilled in the art to produce a method as specified in claim 6.

5. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Booth in view Oguchi, and in further view of Ohtsuka et al. (USPgPub: 2003/0003544), hereinafter Ohtsuka.

Regarding claim 19, as discussed above the combination of Booth and Oguchi discloses all of the limitations except, "adjusting the drive current to the sub-pixels to achieve a colour inside the determined colour gamut comprises adjusting the drive current, not only of a first real primary colour which would have a negative drive stimulus value, but also of at least one other real primary colour which has a positive drive stimulus value."

Ohtsuka discloses a color calibration method for a display device that includes converting colors outside the range to points within the range based on alteration of the drive signals (paragraph 78).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Booth, Oguchi, and Ohtsuka. The motivation for doing so would be to allow sub-pixels unable to display certain colors to display a color closely related to the expected color. This allows the display to produce as close to completely matched image as achievable by the display unit. Thus, it would have been obvious to one skilled in the art to apply the adjustment method of Ohtsuka to the combined methods of Booth and Oguchi to produce a method similar to the method of claim 19.



Regarding claim 20, Ohtsuka discloses projecting a color using the normal (orthogonal) projection from outside of the color gamut to inside the color gamut (paragraph 78).

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571) 272-7903. The examiner can normally be reached on M-F 8:30-5.

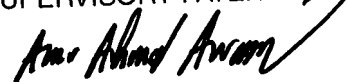
Art Unit: 2629

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steven E. Holtón  
Division 2629  
May 23, 2007

AMR A. AWAD  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Amr A. Awad", is written over the printed name and title.